

Species Diversity, 2001, 6, 347–354

## Two New Species of the *Copidognathus tricornatus* Group (Arachnida: Acari: Halacaridae) from the Great Barrier Reef Marine Park

Jürgen C. Otto

Australian Institute of Marine Science, PMB 3, Townsville, Qld. 4810, Australia

E-mail: j.otto@aims.gov.au

(Received 16 October 2000; Accepted 18 October 2001)

Two new species of the *Copidognathus tricornatus* group are described from reefs of the Great Barrier Reef lagoon in northeastern Australia: *C. leptoporus* sp. nov. and *C. megaloporus* sp. nov. A key to Australian species in the *C. tricornatus* group is provided.

**Key Words:** Australia, Great Barrier Reef, Halacaridae, *Copidognathus*, new species.

### Introduction

The *Copidognathus tricornatus* group (see Bartsch 1997 for a recent review) is one of several currently recognised species groups within the halacarid genus *Copidognathus*. Species in this group have been recorded from all oceans, from cold temperate to tropical waters, and from marine to brackish water basins. Nine species were previously known: *C. dictyotellus* Bartsch, 1998 from Western Australia (Bartsch 1998); *C. dictyotus* Bartsch, 1993 from Malaysia (Bartsch 1993); *C. hummelincki* (Viets, 1936) from the Western Atlantic and Caribbean Sea (Viets 1936; Bartsch 1997); *C. kagamili* Newell, 1950 from the Northeastern Pacific and Aleutian Islands (Newell 1950; Bartsch 1997); *C. longipes* Bartsch, 1973 from the Northwestern Atlantic (Bartsch 1973, 1997); *C. mucronatus* Viets, 1928 from the Black Sea (Viets 1928; Bartsch 1997); *C. quadricostatus* (Trouessart, 1894) from the Northeastern Atlantic and Mediterranean (Trouessart 1894; Bartsch 1997); *C. tricornatus* (Viets, 1938) from Eastern Australia (Viets 1938; Bartsch 1997); and *C. trouessarti* (Voinov, 1896) from the Northeastern Atlantic and Mediterranean (Voinov 1896; Bartsch 1997). The present paper describes two further species from Australia's Great Barrier Reef.

### Material and Methods

Hand-collected sand and coral rubble was frozen for storage. After thawing, the samples were vigorously stirred in a bowl of water and the water then decanted through a 100  $\mu$ m sieve. Mites were cleared in lactic acid and mounted in PVA or glycerol jelly. Drawings were made with the aid of a *camera lucida*. All ma-

terial was collected by the author, except where stated otherwise.

Abbreviations in descriptions: AD, anterior dorsal plate; AE, anterior epimeral plate; ds-1 to ds-6, dorsal idiosomal setae (excluding those on posterior epimeral plate) numbered in sequence from anterior to posterior; GA, genitoanal plate; glp-1 to glp-4, dorsal gland pores numbered in sequence from anterior to posterior; OC, ocular plate; pas, parambulacral seta(e); PD, posterior dorsal plate; PE, posterior epimeral plate; P-2, P-3, P-4, second, third, and fourth palp segments counted from base; sgs, subgenital seta(e); I–IV, leg I to leg IV. Additional abbreviations used in the illustrations are explained in the captions. All specimens with an accession number prefix QMS are deposited in the Queensland Museum's branch, the Museum of Tropical Queensland, in Townsville. Other depositories: ANIC, Australian National Insect Collection, Canberra (Australia); ZMH, Zoologisches Institut und Zoologisches Museum, Universität Hamburg (Germany).

### *Copidognathus tricornatus* species-group

**Diagnosis.** Dorsal plates reticulated. Setae ds-1 close together in posterior half of AD; glp-1 distinctly anterior to ds-1. OC tapering posteriorly, with two corneas, posterior one of them often subdivided. PD almost twice as long as wide and with two or four narrow, abruptly raised costae; gland pores on PD inconspicuous or absent. Leg I at least as long as idiosoma.

### *Copidognathus leptoporus* sp. nov. (Figs 1, 2)

**Material examined.** Holotype: female (QMS105748), Great Barrier Reef Marine Park, No Name Reef, ca. 14°39'S 145°40'E, 9 Oct. 1998, coralline algae at 9 m. Paratypes: two females (QMS105749/105750), three males (QMS105752–QMS105754), data as for holotype; one female (QMS105751), one male (ZMH), one male (ANIC), same data as previous except from hydroids at 9 m; one female (QMS105755), Great Barrier Reef Marine Park, Myrmidon Reef, 18°16.69'S 147°23.21'E, 14 Apr. 1998, coralline algae at 10 m; one female (QMS105756), Great Barrier Reef Marine Park, Reef 21–149, 21°06'S 151°43'E, reef flat, 22 Apr. 1999, coarse sand at 0.5 m.

**Description.** *Female and male.* Idiosoma of female 214–243 µm long (holotype 243 µm), that of male 208–221 µm long. AD shorter than wide, reticulated throughout except for area along anterior margin (Fig. 1A); anteriorly with swelling with distinctly uneven surface; ds-1 separated by 6.4–12.8 µm, equivalent to 0.06–0.11 of width of AD; posterior margin truncate or slightly concave. Median elevated area anterior to ds-1 consisting of thickened cuticular bars forming reticulated ornamentation (Fig. 1F); one of central panels of elevated area with canaliculi; pair of glp-1 anterolateral to elevated area. OC reticulated (Fig. 1G), with small field of canaliculi between corneas; glp-2 and pore canaliculus near lateral margin; ds-2 present anteriorly. PD widest in anterior half, with pair of medial and pair of lateral costae, both extending to or close to anterior margin of plate; costae smooth without rosette pores (Fig. 1C); ds-3 inserted adjacent to lateral costa and ds-4, ds-5, and ds-6 near lateral margin of medial costa; field of canaliculi directly anterior to

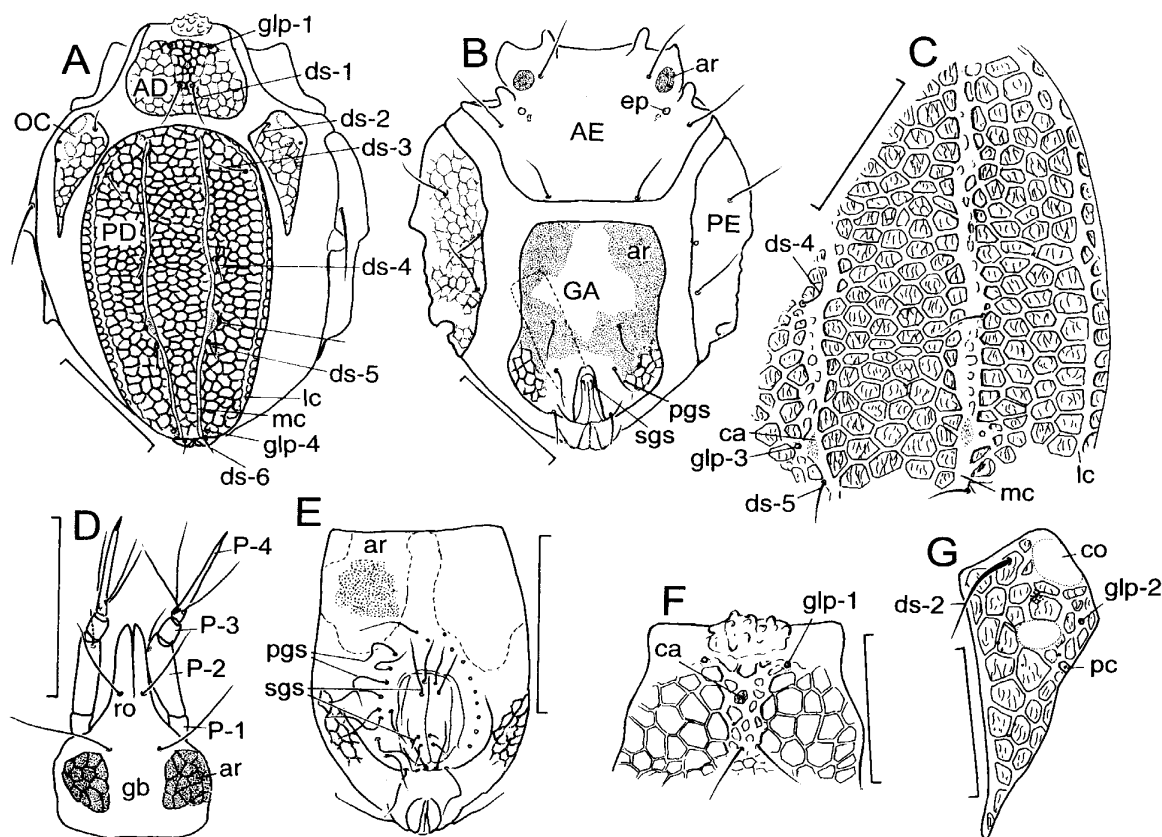


Fig. 1. *Copidognathus leptoporus* sp. nov., adult. A, female, idiosoma, dorsal view; B, female, idiosoma, ventral view; C, male, part of posterior dorsal plate; D, female, ventral gnathosoma; E, male, genitoanal plate; F, male, anterior part of anterior dorsal plate; G, female, right ocular plate. AD, anterior dorsal plate; AE, anterior epimeral plate; ar, areola; ca, canaliculi; co, cornea; ds-1 to ds-6, dorsal setae in sequence; ep, epimeral pore; GA, genitoanal plate; glp-1 to glp-4, gland pores in sequence; lc, lateral costa; mc, medial costa; OC, ocular plate; pc, pore canaliculus; PE, posterior epimeral plate; pgs, perigenital setae; P-1 to P-4, palp segments numbered in sequence; ro, rostrum; sgs, subgenital setae. Scale bars: A, B, D, E=100  $\mu$ m; C, F, G=50  $\mu$ m.

ds-5 next to glp-3 on widened part of costa; glp-4 anterior to ds-6. AE with epimeral pores and pair of porous areolae posterior to leg I insertions (Fig. 1B); remainder of plate smooth; three pairs of ventral setae as illustrated (Fig. 1B), distance between those of most anterior pair greater than half of length of plate. PE with one dorso-lateral and three ventral setae, reticulated, without porous areolae. GA truncate anteriorly, posterolaterally reticulate; in female, areolae of either side joined posteriorly, completely enclosing smooth area; in male, areolae separated posteriorly (Fig. 1E); female with three pairs of pgs and one pair of sgs; male with 24–27 pgs and four pairs of sgs. Ovipositor extending beyond most anterior pair of pgs but not to anterior margin of GA.

Gnathosomal base with pair of areolae not distinctly longer than wide (Fig. 1D); one pair of maxillary setae on gnathosomal base, other pair half-way along rostrum. Rostrum not extending to end of P-3; rostral sulcus reaching to level of

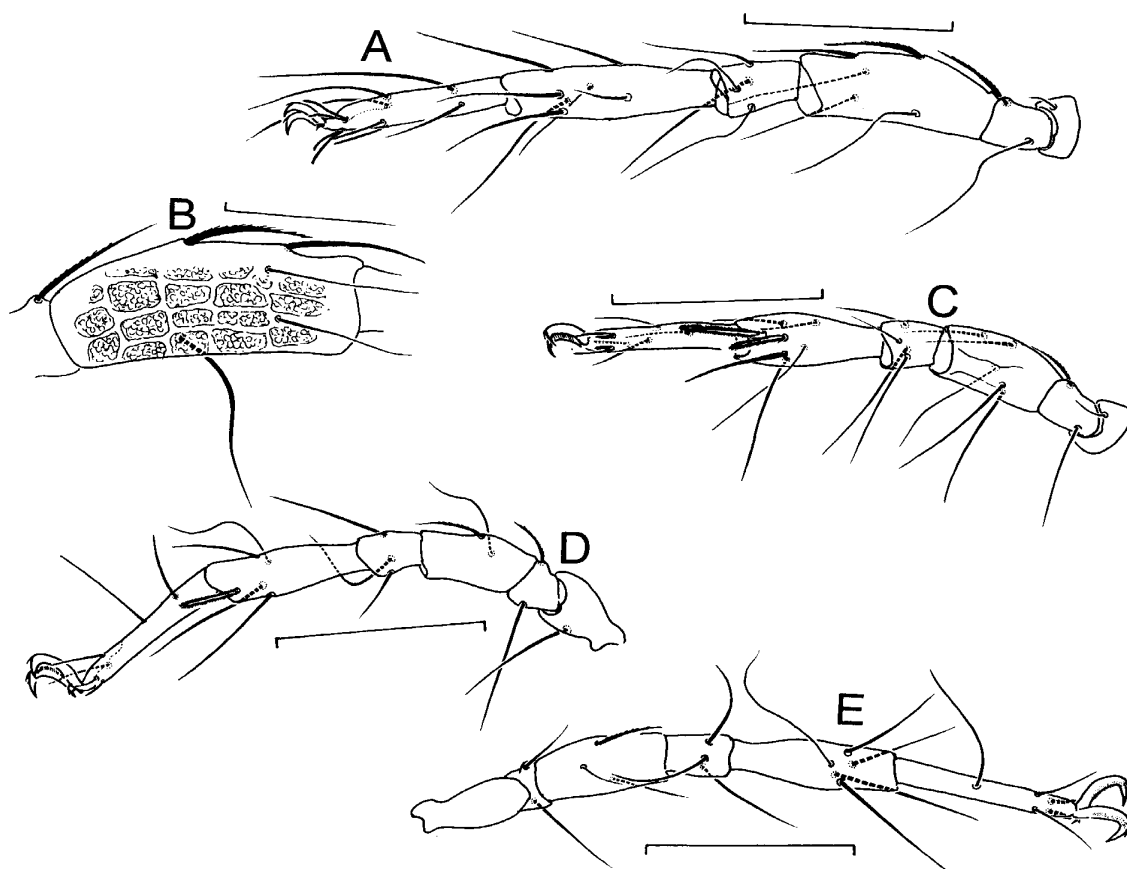


Fig. 2. *Copidognathus leptoporus* sp. nov., adult female. A, leg I, ventromedial view; B, telofemur I, lateral view; C, leg II, ventromedial view; D, leg III, ventromedial view; E, leg IV, dorsolateral view. Scale bars: A, C, D, E = 100  $\mu$ m; B = 50  $\mu$ m.

distal pair of maxillary setae.

Leg I (Fig. 2A) longer than other legs (Fig. 2C–E); lateral flanks of telofemur panelled (Fig. 2B). Two ventral setae on tibia II and one ventral setae on tibia III bipectinate; all ventral setae on tibiae I and IV glabrous. Dorsal setae on basifemora I–IV and telofemur III and IV, and most proximal dorsal setae on telofemur I and II, serrated. Tarsi III and IV with four and three dorsal setae, respectively. Paired claws on tarsi II–IV finely pectinate; no pecten seen on claws of tarsus I. Lateral and medial pas on tarsus III at same distance from distal end of segment, similar on tarsus IV.

**Remarks.** *Copidognathus leptoporus* sp. nov. is most similar to *C. dictyotus* Bartsch, 1993 from Malaysia. Both species share, among other characters, the pair of porous areolae anterolaterally on the AE, the anterior and median raised areas on the AD, the smooth costae with a field of canaliculi near glp-3, and the undivided posterior cornea. *Copidognathus leptoporus* can be distinguished from *C. dictyotus* by the lack of porous areolae on the PE, the shape of the areola on the female GA (in *C. dictyotus* the areolae do not reach the anterior margin), and the smaller areolae on the AE.

***Copidognathus megaloporus* sp. nov.**

(Figs 3, 4)

**Material examined.** Holotype: female (QMS105762), Great Barrier Reef Marine Park, Horseshoe Reef, 22°01.27'S 152°36.69'E, 15 Apr. 1999, coarse sand and rubble at 1 m. Paratypes: one female (ZMH), one female (ANIC), data as for holotype; two females (QMS105757/QMS105758), Great Barrier Reef Marine Park, 18°41.91'S 147°06.49'E, Loadstone Reef, 12 Apr. 1998, sand and rubble at 2 m.

**Description.** *Female.* Idiosoma 262–278  $\mu\text{m}$  long (holotype 278  $\mu\text{m}$ ). AD longer than wide. Setae ds-1 separated by 32–38  $\mu\text{m}$ , equivalent to 0.26–0.32 of width of plate (Fig. 3A), only slightly less than distance between posterior pair of setae on AE (Fig. 3B). Oblong and elevated areola anterior to ds-1 with deep pits, reticulate ornamentation along its margins, and pair of glp-1 anteriorly, these last often difficult to discern (Fig. 3D); another elevated and pitted areola also present, with shallower but wider pits on anterior margin of plate; posterior margin of AD broadly

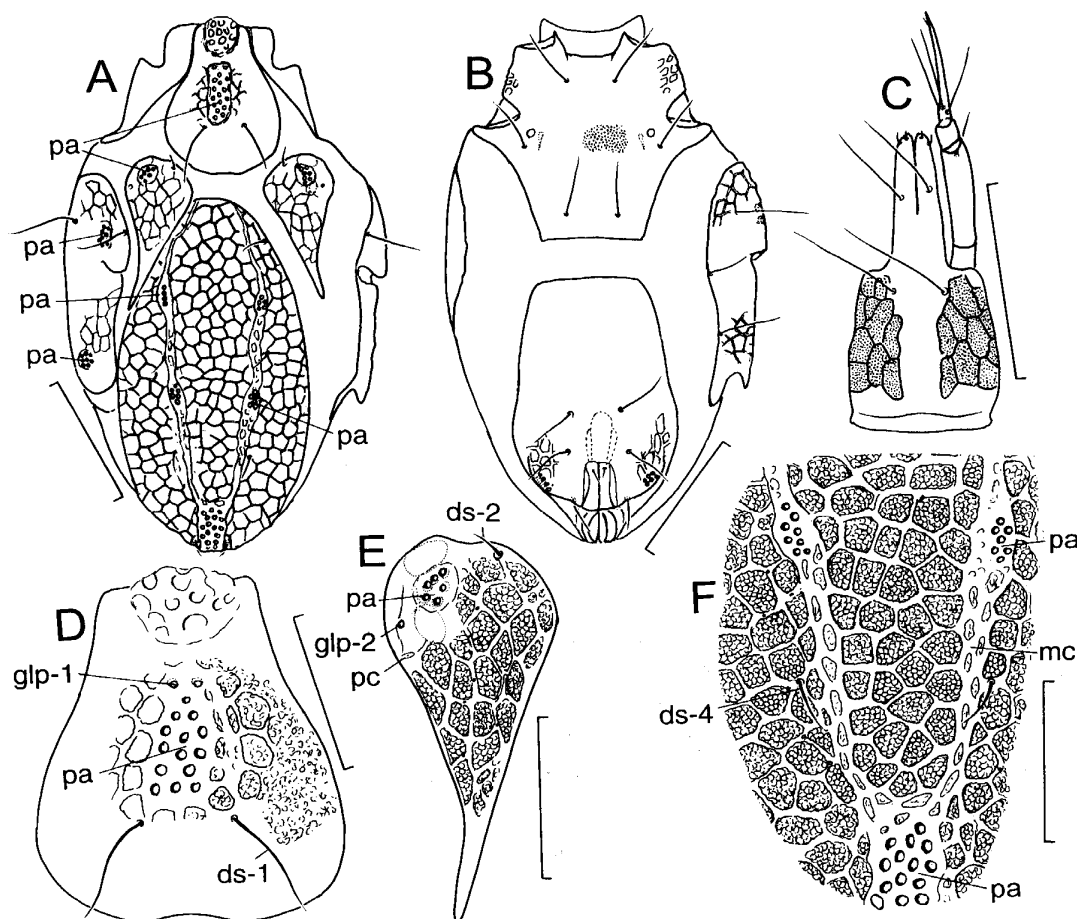


Fig. 3. *Copidognathus megaloporus* sp. nov., female. A, idiosoma, dorsal view; B, idiosoma, ventral view; C, gnathosoma, ventral view; D, anterior dorsal plate; E, left ocular plate; F, part of posterior dorsal plate. ds-1, ds-2, ds-4, dorsal setae 1, 2, and 4, respectively; glp-1, glp-2, gland pores 1 and 2; mc, medial costa; pa, pitted areola. Scale bars: A, B, C=100  $\mu\text{m}$ , D–F=50  $\mu\text{m}$ .

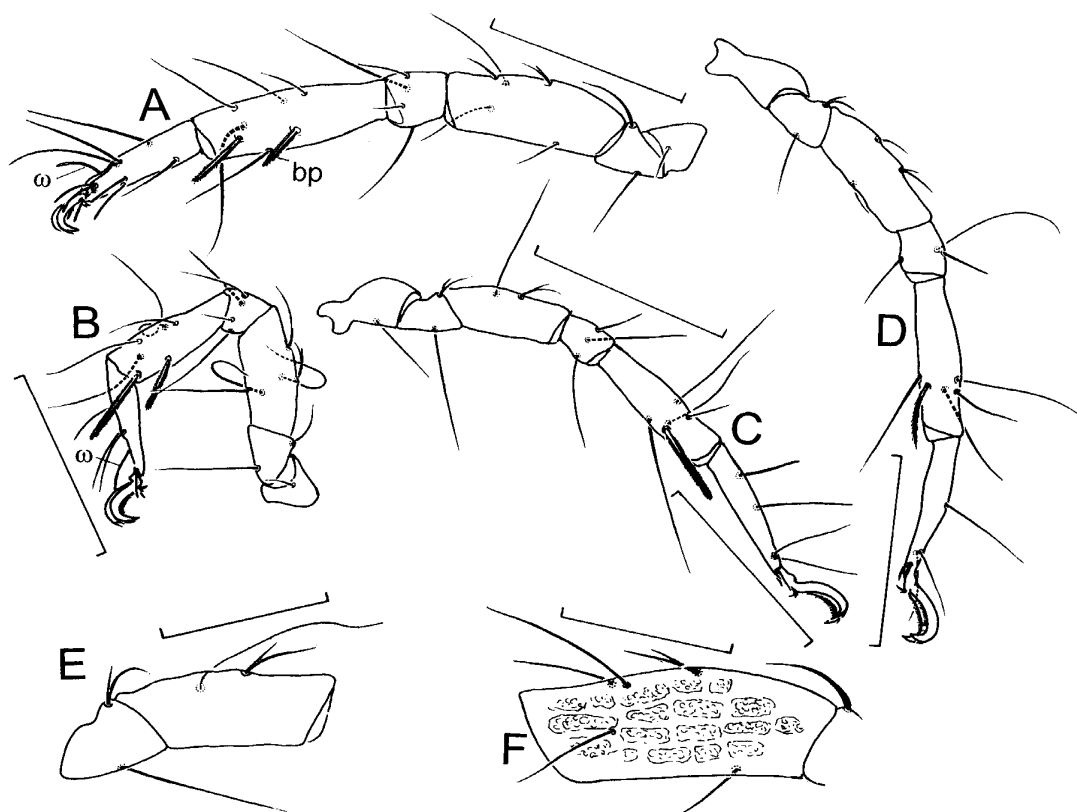


Fig. 4. *Copidognathus megaloporus* sp. nov., adult female. A, leg IV, medial view; B, leg II, medial view; C, leg III, medial view; D, leg IV, medial view; E, basi- and telofemur III, medial view; F, telofemur I, lateral view. Scale bars: A–D=100  $\mu$ m; E, F=50  $\mu$ m.

rounded but with slight median indentation. OC reticulated almost throughout (Fig. 3E); laterally with glp-2 and pore canaliculus; conspicuous elevated areola between corneas bearing several deep pits similar to those on AD. PD widest about half-way along plate, more coarsely reticulated than that of previous species, with each panel subdivided by delicate mesh, and with only two, posteriorly convergent, costae (Fig. 3F); each costa with two deeply and conspicuously pitted areolae. AE finely punctate, without porous or pitted areolae but with some reticulation anterolaterally; three pairs of setae, with anterior pair almost as close together as ds-1. PE with one dorsolateral and three ventral setae and two pitted areolae; remainder of plate with some reticulation. GA posterolaterally with pitted areola and reticulation. Ovipositor extending to but not beyond most anterior pair of pgs.

Gnathosoma (Fig. 3C) slender when compared to previous species; oblong, porous areola on either side of gnathosomal base. Rostrum reaching almost to end of P-3; pair of maxillary setae inserted as shown in Fig. 3C.

Telofemur I panelled (Fig. 4F), though not as conspicuously as previous species. Tibiae I and II each with two bipectinate setae (Fig. 4A, B); tibiae III and IV each with one such seta (pectination on tibia IV less pronounced) (Fig. 4C, D); bipectinate setae on legs I–III blunt, that on tibia IV tapering. Dorsal setae on basifemur III and IV, most proximal dorsal setae on telofemur I and II, and distodorsal setae on telofemora III and IV (Fig. 4E, F) all bifurcate. Paired claws on

tarsi II–IV finely pectinate, no pecten seen on claws of tarsus I.

**Remarks.** *Copidognathus megaloporus* sp. nov. can be distinguished from all other species in the *C. tricornatus* group by the deeply pitted areolae on the AD, OC, PE, and PD, the two bipectinate setae on tibia I, the bipectinate seta on tibia IV, and the unusually long AD as well as the converging medial costae.

### Key to Australian Species of the *Copidognathus tricornatus* Group

1. Ds-2 inserted on OC ..... 2
  - Ds-2 inserted in membranous cuticle ..... 3
2. AD, OC, PE, and PD with coarsely pitted areolae; tibia I with two bipectinate setae, and tibia IV with one such seta; AE without porous areolae..... *C. megaloporus* sp. nov.
  - AD, OC, PE, and PD without such coarsely pitted areola; tibiae I and IV without bipectinate setae; AE with pair of porous areolae..... *C. leptoporus* sp. nov.
3. Ovipositor extending beyond anterior margin of GA; PD with 6–8  $\mu$ m wide mesh; medial costa on PD not reaching anterior margin of PD..... *C. tricornatus* (Viets)
  - Ovipositor not extending to anterior margin of GA; PD with 3–4  $\mu$ m wide mesh; medial costa on PD reaching anterior margin of PD..... *C. dictyotellus* Bartsch\*

\*This species was originally described as *C. dictyotus* Bartsch, 1997, subsequently found to be a junior homonym of *C. dictyotus* Bartsch, 1993, and hence renamed *C. dictyotellus* Bartsch, 1998 (Bartsch 1998).

### Acknowledgments

I thank the Australian Biological Resources Study (ABRS) for providing all the necessary funding and the Australian Institute of Marine Science (AIMS) for hosting the project. I also wish to acknowledge Hiroshi Abé, Ilse Bartsch, and an anonymous referee for their comments on the manuscript, and the Great Barrier Reef Marine Park Authority for permission to collect mites in the marine park. This is AIMS publication no. 1060.

### References

- Bartsch, I. 1973. Halacaridae (Acari) von der Josephinebank und der Großen Meteorbank aus dem östlichen Nordatlantik. I. Die Halacaridae aus den Schleppnetzproben. Meteor Forschungsergebnisse D 15: 51–78.
- Bartsch, I. 1993. Halacaridae (Acari) von Malaysia. Beschreibung von drei Arten der Gattung *Copidognathus*. Entomologische Mitteilungen aus dem Zoologischen Museum Hamburg 11: 45–58.
- Bartsch, I. 1997. A new species of the *Copidognathus tricornatus* group (Acari: Halacaridae) from Western Australia with a review of this species-group. Species Diversity 2: 155–166.
- Bartsch, I. 1998. *Copidognathus dictyotellus* nom. nov., replacement name for a homonym (Acari: Halacaridae). Species Diversity 3: 317–318.

- Newell, I. M. 1950. New species of *Copidognathus* (Acari, Halacaridae) from the Aleutians. American Museum Novitates (1476): 1–19.
- Trouessart, E. L. 1894. Note sur les acariens marins (Halacaridae) dragués par M. P. Hallez dans le Pas-de-Calais. Revue Biologique du Nord de la France 6: 154–184.
- Viets, K. 1928. Wassermilben aus dem Schwarzen Meer, dem Kaspischen Meer und dem Aral-See. Abhandlungen. Naturwissenschaftlicher Verein zu Bremen 27: 47–80.
- Viets, K. 1936. Zoologische Ergebnisse einer Reise nach Bonaire, Curaçao und Aruba im Jahre 1930. Zoologische Jahrbücher, Abteilung für Systematik und Ökologie der Tiere 67: 389–424.
- Viets, K. 1938. Über eine neue Meeresmilbe, *Copidognathopsis tricornata* Lohmann (Halacaridae, Acari). Zoologischer Anzeiger 122: 127–132.
- Voinov, D. N. 1896. *Halacarus Trouessarti*. Nouvelle espèce d'Halacaridae de la Méditerranée. Bulletin de la Société Zoologique de France 21: 128–129.